Finally, there is a critical essay by G. Allen on the limitations of twin studies in evaluating the contribution of heredity and environment in the causation of particular characteristics and disorders.

The standard of the articles in this series is very high and as reviews of current thought in various fields of human genetics they are particularly valuable.

ALAN E. H. EMERY

**Larsson, Tage** and **Sjögren, Torsten.** *Dystonia Musculorum Deformans: A Genetic and Clinical Population Study of* 121 *Cases.* Acta Neurologica Scandinavica Supplementum 17. (Ad volumen 42, 1966.) Copenhagen, 1966. Munksgaard. Pp. 232.

THIS LATEST SCANDINAVIAN saga presents a detailed clinical and genetic analysis of yet another uncommon heredo-degenerative neurological disorder in Norrbotten, the most northerly county of Sweden. Norrbotten adjoins Västerbotten, the scene of earlier field studies by Sjögren and Larsson.

Those who are immune to the infective academic enthusiasm of the prospector seeking the unusual and the unsuspected, may question whether the prodigious effort and genealogical virtuosity which this comprehensive account represents, is worth the trouble. However, it can be affirmed without hesitation that this study has enormous value, apart from its academic importance. In the absence of more specific (? biochemical) characterization of heredo-degenerative disorders such as torsion dystonia, the results of this sort of study underline the limitations of clinical criteria for rigid nosological differentiation in neurological disease, for here we have apparently distinct clinical inter- and intrafamilial forms (hyperkinetic, myostatic and abortive) mingling freely and apparently randomly.

Clearly the opportunities for extensive genealogical studies of a peasant population dating to the early seventeenth century are very limited, but this particular study, more than earlier investigations by these workers, presents a fascinating account of a community with a disease as a biological phenomenon, and not merely a mass of data about a disease. Because the arrival of the earliest Swedish colonizers of this remote and inhospitable area, bringing with them unsuspected neurological problems, coincided with the introduction of systematic parish records, it is possible to study the spread of the disease pari passu the development of the community. There is a brief account of historical, economic, geographical and sociological factors —in short an ecological review of the people and their disease, sufficient to justify more intensive research in these fields. Of course, from the genetic standpoint, the demonstration that the condition is inherited as an autosomal dominant did not need such substantial effort.

There are minor adverse comments. The authors have necessarily adopted for their field work a more elaborate system of coding and abbreviation than in previous studies, but it makes the text difficult to follow and sometimes confusing. It should have been simplified and expanded for the actual descriptive account.

Larsson and Sjögren conclude that environmental factors contribute little to the variation in clinical picture, and explain differences in terms of multifactorial modifying genes. This rejection of environmental factors is not justified on the evidence presented, and perhaps closer scrutiny of possible environmental factors in future surveys of late-onset heredo-degenerative disorders will be worth while.

In general, however, this volume once again puts all who are interested in neurological genetics in the authors' debt for the care and thoroughness of their survey.

JOHN WILSON

**Court Brown, W. M., Buckton, Karin E., Jacobs, Patricia A., Tough, Ishbel M., Kuenssberg, E. V.** and **Knox, J. D. E.** *Chromosome Studies On Adults.* Eugenics Laboratory Memoirs XLII. London, 1966. Cambridge University Press. Pp. v+91. Price 32s. 6d.

CHROMOSOME ABNORMALITY IS a common cause of developmental abnormality in man. It has, however, for some time been apparent that a chromosome pattern different from the normal does not necessarily involve developmental

abnormality in the carrier or a descendant. In this excellent monograph Court Brown, Buckton, Jacobs, Tough, Kuenssberg and Knox make the first major attempt to investigate the frequency of of karyotype variation in human populations unselected with respect to disease or defect of development. The results are clear cut and are of great interest to those who work on human cytogenetics. Particularly important to the medical geneticist is the relevance of the findings described in this monograph to the interpretation of chromosome variation in non-specific mental or physical maldevelopment.

The authors collect together, and discuss in greater detail, their work on this subject outlined in previous publications and introduce fresh data. The main group of 438 people were randomly sampled from the lists of four general medical practices in Scotland. Data on a further 582 people are also considered. It is concluded that 6 per cent of the adult male population and 2 per cent of the adult female population show some type of chromosome structural change; the difference between the sexes being attributable to variation in the Y chromosome in males. An interesting section of this monograph is concerned with the distribution of chromosome counts in relation to aneuploidy and ageing and to the distribution of aneuploidy in "early" (harvested at 45–53 hrs) and "late" (harvested at 65–75 hrs) blood cultures. The authors conclude that an increase in aneuploid cells in cultures derived from older individuals is referable to an ageing effect "which takes place in vivo although it can be enhanced by prolonging the culture time". A good case is made to suggest that the loss of an X chromosome in females and the Y chromosome in males is the main cause of aneuploidy in counts derived from ageing individuals.

In their interesting discussion Court Brown and his colleagues divide the various types of structural chromosome change noted in the populations studied into two main classes: (i) obvious structural rearrangements, e.g. translocations or inversions; and (ii) minor change (? anomaly) restricted to the Y chromosome or a single autosome, and only to those autosomes which are accepted as showing secondary constrictions. The latter class is common, heritable, does not necessarily indicate a change in gene content and does not appear harmful to the carrier. Structural rearrangements occur in about one in 200 individuals from the populations studied by these authors. It would appear that translocation can occur in a genetically unbalanced form without obvious developmental defect. Although they do not discuss the problem at length the authors raise the question of what degree of departure from accepted normality is necessary to justify the designation abnormal. Should, for instance, the term anomaly be used to describe minor, but constant and unequivocal, changes in the length of a short arm of group 13–15 or 21–22? If so, does the designation anomaly imply unaltered gene content, or indeed always normal physical and mental development?

This monograph is well set out and the text easily readable. Methods of investigation are carefully outlined. Tables, figures and pedigree charts are well presented. Idiograms, though adequate, are perhaps not as well defined as might be expected in this standard of publication. The detailed appendices contain much information of delight to the epidemiologist. This monograph is a valuable contribution to the field of human cytogenetics.

ERIC BLANK

**Darlington, C. D.** and **Lewis, K. R.** (Editors). *Chromosomes Today*. Volume I. Edinburgh, 1966. Oliver and Boyd. Pp. xii+274. Price 63s.

THIS VOLUME FORMS a record of the proceedings of the First Oxford Chromosome Conference held from 28th to 31st July 1964 and is a supplement to *Heredity*, volume 19.

In a short introductory passage the editors explain that the meeting was conceived to further the contact between those workers in the various branches of biology, medicine and agriculture who are engaged in the study of chromosomes. To this end a programme was organized consisting of a series of papers and demonstrations which "would reveal something of the scope and range of chromosome work to-day".

The opening address by Professor C. D. Darlington, entitled "The chromosomes as we